

IN THE CLAIMS

Please amend claims 1, 13, and 27.

Please enter the pending claims, including claims 1-30, as follows:

1. (Currently Amended) A method comprising:

providing a photolithographic scanner, said photolithographic scanner comprising a light source and a last lens element, said light source producing light having a wavelength, said last lens element having a refractive index;

providing an index-matching liquid (IML) based on said wavelength and said refractive index;

providing a photoresist, said photoresist comprising a combination of one or more IML-non-soluble additives and one or more IML-soluble-additives and other constituents wherein form and concentration are determined by properties of said IML;

binding said other constituents of said photoresist to said IML-non-soluble additives;

placing said IML in contact with both said last lens element and said photoresist;

preventing diffusion of said IML-non-soluble additives and said other bound constituents into said IML;

thus neutralizing acid diffusing from said IML into said photoresist;

promoting diffusion of said IML-soluble-additives from said photoresist into said IML and creating a concentration of said IML-soluble additives in said IML;

thus improving wettability and creating surface inhibition of surface layer of said photoresist; and

illuminating said IML and said photoresist with said light from said last lens element.

2. (Previously Presented) The method of claim 1 wherein said combination of one or more IML-non-soluble additives and one or more IML-soluble-additives is based upon said IML.
3. (Previously Presented) The method of claim 1 wherein said IML comprises water.
4. (Previously Presented) The method of claim 1 wherein said one or more IML-non-soluble additives comprises at least one water-insoluble constituent.
5. (Previously Presented) The method of claim 4 wherein said at least one water-insoluble constituent is selected from a group consisting of a hydrophobic ionic photoacid generator and a non-ionic photoacid generator.
6. (Previously Presented) The method of claim 4 wherein said at least one water-insoluble constituent comprises a water-insoluble quencher.
7. (Previously Presented) The method of claim 4 wherein said at least one water-insoluble constituent comprises a water-insoluble polymer.

8. (Previously Presented) The method of claim 4 wherein water-soluble constituents are bound to said at least one water insoluble constituent via a binding method selected from a group consisting of covalent binding, ion pairing, and Van der Waal's forces.
9. (Previously Presented) The method of claim 4 wherein said at least one water-insoluble constituent may react when said photoresist is used to modulate susceptibility to etch.
10. (Previously Presented) The method of claim 1 wherein said one or more IML-soluble additives comprises at least one water-soluble constituent.
11. (Previously Presented) The method of claim 10 wherein said at least one water-soluble constituent is selected from a group consisting of a water-soluble photoacid generator, a water-soluble quencher, a water-soluble buffer, a water-soluble surfactant, and a water-soluble plasticizer.
12. (Previously Presented) The method of claim 11 wherein said water-soluble surfactant is a fluorocarbon-based surfactant.
13. (Currently Amended) An apparatus comprising:
a substrate;

a photoresist disposed in contact with said substrate;
an index-matching liquid (IML) disposed in contact with said photoresist; and

a last lens element disposed in contact with said IML, wherein said photoresist comprises a protective layer ~~a combination of~~ formed by one or more IML-non-soluble additives ~~and wherein said protective layer has reduced surface interaction in contact with said IML due to~~ one or more IML-soluble-additives.

14. (Previously Presented) The apparatus of claim 13 wherein said one or more IML-soluble additives are specific to a particular IML.
15. (Previously Presented) The apparatus of claim 14 wherein said particular IML comprises water and said one or more IML-non-soluble additives comprises at least one hydrophobic additive.
16. (Previously Presented) The apparatus of claim 15 wherein said at least one hydrophobic additive comprises a non-ionic photoacid generator.
17. (Previously Presented) The apparatus of claim 15 wherein said at least one hydrophobic additive comprises a water-insoluble quencher.
18. (Currently Amended) The apparatus of claim 15 wherein said at least one ~~of said~~ hydrophobic additives comprises a water-insoluble polymer.

19. (Previously Presented) The apparatus of claim 15 wherein water-soluble constituents are bound to said at least one hydrophobic additive via a binding method selected from a group consisting of covalent binding, ion pairing, and Van der Waal's forces.
20. (Previously Presented) The apparatus of claim 15 wherein said at least one hydrophobic additive may react when said photoresist is used to modulate susceptibility to etch.
21. (Previously Presented) The apparatus of claim 14 wherein said particular IML comprises water and said one or more IML-soluble additives comprises at least one hydrophilic additive.
22. (Previously Presented) The apparatus of claim 21 wherein said at least one hydrophilic additive comprises a water-soluble quencher.
23. (Previously Presented) The apparatus of claim 21 wherein said at least one hydrophilic additive comprises a water-soluble buffer.
24. (Previously Presented) The apparatus of claim 21 wherein said at least one hydrophilic additive comprises a water-soluble surfactant.

25. (Previously Presented) The apparatus of claim 24 wherein said water-soluble surfactant comprises a fluorocarbon-based surfactant.

26. (Previously Presented) The apparatus of claim 21 wherein said at least one hydrophilic additive comprises a water-soluble plasticizer.

27. (Currently Amended) A system comprising:

a last lens element of a lithography exposure system, said last lens element having a specific index of refraction;

~~an a~~ a specific index-matching liquid (IML) in contact with said last lens element, said specific IML having an index of refraction equal to said specific index of refraction to within a specified tolerance, said specific IML comprising one or more IML-soluble-additives to reduce surface interaction with a photoresist; and

said photoresist in contact with said specific IML, said photoresist comprising a protective layer formed from ~~combination of~~ one or more IML-non-soluble additives ~~and one or more IML-soluble-additives to reduce surface interaction with~~ said specific IML.

28. (Previously Presented) The system of claim 27 wherein said IML comprises water and said one or more IML-non-soluble additives comprises at least one water-insoluble constituent.

29. (Previously Presented) The system of claim 28 wherein said at least one water-insoluble constituent comprises a constituent selected from a group consisting of a

non-ionic photoacid generator, a hydrophobic ionic photoacid generator, a quencher, a polymer, an oligomer, and a molecular species.

30. (Previously Presented) The system of claim 27 wherein said IML comprises water and said one or more IML-soluble-additives comprises at least one water-soluble constituent wherein said at least one water-soluble constituents comprises a constituent selected from a group consisting of a water-soluble photoacid generator, a water-soluble quencher, a water-soluble buffer, a water-soluble surfactant, and a water-soluble plasticizer.